# F. NOISE

## F.1 REGULATORY SETTING

Federal and state laws have led to the establishment of noise guidelines for the protection of the population from adverse impacts from environmental noise. Many local noise goals are implemented as planning guidelines and by enforceable noise ordinances.

### F.1.1 FEDERAL

The Noise Control Act of 1972 directed the US EPA to develop noise guidelines that would protect the population from the adverse effects of environmental noise. These are guidelines and not construed as standards or regulations. In 1981, EPA concluded that noise pollution should be addressed at the local level and primary responsibility for regulating noise was transferred to State and local government (EPA, 2006).

### F.1.2 OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the federal Department of Labor, Occupational Safety, and Health Administration (OSHA) has adopted regulations (29 CFR § 1910.95) that establish maximum noise levels to which workers at a facility may be exposed. These OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time during which the worker is exposed.

### F.1.3 STATE

State law (GC 65300) requires that cities and counties prepare and adopt a General Plan. Government Code section 65302(f) establishes that a noise element is a required component of a General Plan. In addition, California Department of Health Services (1987) has developed noise guidelines for the noise elements in local General Plans. The state guidelines also recommend that local jurisdictions consider adopting local nuisance noise control ordinances.

### F.1.4 CAL-OSHA

As a result of the passage of Cal-OSHA, the California Occupational Safety and Health Administration (Cal-OSHA) has promulgated Occupational Noise Exposure Regulations (8 CCR § 5095 et seq.) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards described above.

## F.2 BACKGROUND

Noise is often described as sound traveling through the air, such as traffic from a nearby road. Sound is defined as any pressure variation in air that the ear can detect. If the pressure variations occur frequently enough, at least 20 times per second, they can be heard by the human ear and called “sound.” The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz). The relative loudness or intensity of sound energy is measured in decibels (dB). A decibel is a logarithmic unit of sound energy that represents the smallest variance in sound that the human ear can detect.

The standard unit for measuring sound is the decibel (dB). Because the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent rating scale has been devised to interpret noise levels relative to the sensitivity of human hearing. The A-weighted decibel scale accounts for this. Environmental noise is usually measured in A-weighted decibels (dBA) and typically fluctuates over time. An A-weighted decibel (dBA) is a decibel corrected for the variation in frequency response of the typical human ear at commonly encountered noise levels. The following noise descriptors are commonly used to evaluate environmental noise:

- $L_{eq}$ – The energy-equivalent noise level ($L_{eq}$), is the average acoustic energy content of noise, measured during a specific time period.
- $L_{dn}$ – The day-night average noise level ($L_{dn}$), is a 24-hour average $L_{eq}$ with a 10 dBA penalty added to noise occurring during the hours of 10pm and 7am to account for the greater nocturnal noise sensitivity of people.
- CNEL – The Community Noise Equivalent Level (CNEL), is also a 24-hour average $L_{eq}$ with no penalty added to noise during the day time hours between 7am and 7pm, a penalty of 5 dB added to evening noise occurring between 7pm and 10pm, an penalty of 10 dB added to nighttime noise occurring between 10pm and 7am.

Noise levels from a source diminish as distance to the receptor increases. A rule of thumb for traffic noise is that for every doubling of distance from the road, the noise level is reduced by 3 to 4.5 dBA. For a single source of noise (i.e. stationary equipment) the noise is reduced by 6dBA for each doubling of distance away from the source. Noise levels can also vary with the presence of structures that can reflect sound and either intensify or diminish the noise level. Community reaction to a change in noise levels varies, depending upon the magnitude of the change. In general, a difference of 3 dBA is a minimally perceptible change, while a 5 dBA difference is the typical threshold that would cause a change in community reaction.

In the urban setting, street and traffic noise can be considered background noise. But unless a rural home is on a highway, one might notice a car coming on a rural road for miles. Noises in the rural setting can seem amplified if there are no barriers to the source. But noise levels are reduced by increasing distance, air density, wind, and obstructions (trees, buildings, and natural landscape features). Table F.2-1 provides a list of expected decibel levels for common noise sources. Note that a forest in the absence of trucks and heavy machinery would have a relatively low background environmental noise level (30 dBA).

**Table F.2-1 Decibel levels for Common Noise Sources**[1]

| Sound Pressure Level (dBA) | Noise Source |
|---|---|
| 150 | Jet Engine Takeoff at 25 meters |
| 140 | Aircraft Carrier Deck |
| 130 | Military Jet Takeoff |
| 120 | Chain Saw |
| 110 | Pneumatic Chipper |
| 100 | Power Lawn Mower |
| 90 | Boeing 737, one nautical mile before landing |
| 80 | Heavy Truck Traffic |
| 70 | Freeway at 10am |
| 60 | Business Office |
| 50 | Conservational Speech |
| 40 | Library, Bird Calls |
| 30 | Secluded Woods |
| 20 | Whisper |

[1]Adapted from "Noise Sources and their Effects," Purdue University Department of Chemistry, and "Best Practices Guide: Controlling Noise on Construction Sites," Laborer's Health and Safety Fund of North America

## F.3 DATA AND ASSUMPTIONS

The Proposed Program potential treatment acreage by bioregion is described in Chapter 2. Total acreage treated over a ten-year period is projected to be approximately 600,000 acres, which represents about 2.5 percent of the total acreage of CAL FIRE jurisdiction lands that might be treatable in any ten-year period under this proposed Program. Annual acreage treated is expected to about 60,000 acres.

Table F.3-1 provides an estimation of noise levels associated with timber harvesting equipment. Machine equipment used to conduct VTP projects could be expected to

produce comparable levels of noise. Table F.3-1 also includes the sound levels from chainsaws measured at 250 feet. Table F.3-2 describes the dBA at 50 feet of various types of equipment and machinery, which would be used or is similar to equipment likely to be used in the proposed Program and Alternatives. Noise impacts from helicopters (used for ignition of prescribed fire) are based on FAA Advisory Circular-AC36-1G, Bell Series and Hughes models noise levels (CAL FIRE, 2005).

**Table F.3-1 Active Timber Harvest Site Equipment and Activity Noise Level Measurements.**

| Equipment/Activity | Source | Equivalent Continuous Noise Level (Leq)–dB[1] |
|---|---|---|
| Heel Boom Loader | Caterpillar 325 | 60[2] |
| Bull Dozer | Caterpillar D8N | 63 |
| Bull Dozer | Caterpillar D7G | 63[3] |
| Chainsaw | Stihl 046 | 65 |
| Clearing Deck Debris & Stacking Logs | Caterpillar 325 | 60 |
| Skidding & Stacking Logs | Caterpillar 325, Caterpillar S8N w/ backup alarm | 65 |
| Shaking Heel Boom Grappler | Caterpillar 325 | 70 |
| Skidding & Stacking Logs | Caterpillar 325, Caterpillar D7G | 64 |
| Skidding & Stacking Logs | Caterpillar 325, Caterpillar D8N, Caterpillar D7G | 68 |
| Cutting Trees | Stihl 046 | 68 |
| Tree Falling | Tree | 58[4] |

[1] Sight line noise measurements distance = 150 feet
[2] Idling 56 dB
[3] Idling 58 dB
[4] Sight line noise measurement distance = 250 feet
Source: CAL FIRE, 2008, Jackson Demonstration State Forest Management Plan Final Environmental Impact Report.

**Table F.3-2 noise levels of equipment likely to be operated under proposed program**

| Equipment | dBA at 50' | | |
|---|---|---|---|
| Dozer | 85-90 | | |
| Tractor | 77-82 | | |
| Front End Loader | 86-90 | | |
| Hydraulic backhoe | 81-90 | | |
| Hydraulic excavator | 81-91 | | |
| 16 wheel Truck | 81-87 | | |
| Chainsaw | 90 | | |
| Mobile Chippers | 115 | | |
| Helicopter | Flyover dBA at 150 meter | Takeoff dBA at 50’ | Landing dBA at 50’ |
| Bell 206 L-111 | 86.9 | 87.6 | 91.1 |
| Bell 206 L-IV | 83.3 | 84.1 | 87.3 |
| Bell 206 B-III | 85.2 | 88.4 | 90.7 |
| Hughes 500 D | 88.7 | n/a | n/a |

**Table F.3-3 Production rates and associated noise levels for equipment used in proposed program.**

| | Production (acres/day) | Days to Complete a Project | Equipment | dBA @ 50' | Assumptions |
|---|---|---|---|---|---|
| Mechanical mowing | 50 | 5.2 | Tractor | 80 | BLM, plus 1 16-wheel lowbed for move in/out |
| Mechanical dozer blade and pile | 6 | 44.2 | Dozer | 87 | BLM, plus 1 16-wheel lowbed for move in/out |
| Mechanical chaining (2 dozers) | 11 | 22.7 | 2 dozers | 87 | est., 2 dozers 500' apart at 2000'/day, also 2 16-wheel lowbed for move in/out |
| Mechanical excavator mastication | 5 | 52 | excavator | 85 | est., plus one 16 wheel lowbed for move in/out |
| Road side chipping | 7 | 39 | Feller bunches, skidder and mobile 200-400 hp chipper | 115 | Remove 190 tpa 7" in diameter with feller buncher, skid to landing, chip and blow into chip vans |
| Hand pulling cutting, shoveling | 1 | 52 | None | 45 | BLM 5-person crew clearing 5 acres/day |
| Hand cutting and hand clearing | 1 | 52 | 5 chainsaws | 90 | BLM 5-person crew clearing 5 acres/day |
| Herbicide backpack spray | 1 | 52 | None | 45 | BLM 5-person crew spraying 5 acres/day |
| Herbicide ATV spray | 10 | 26 | ATV | 70 | BLM, 10 acres/day |
| Prescribed fire hand ignition | 260 | 1 | Pickup truck, fire engines | 65 | 7 igniters, 1 command vehicle, 1 crew rig, 2 fire engines |
| Prescribed fire helitorch | 260 | 1 | Helicopter | 90 | 2 fire engines, command vehicle, helicopter, helicopter support trucks |
| Prescribed herbivory | 10 | 26 | Pickup truck | 65 | 1 person tending with 1 rt/day |

Based on estimates from ENSR International (ENSR International, 2005) for BLM (USDI BLM, 2005)